

5-14-2019

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Recommended Citation

Weinstein, Mark D., "Packaging Hope: Senior Project Sends Medical Care" (2019). *News Releases*. 927.
https://digitalcommons.cedarville.edu/news_releases/927

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FOR IMMEDIATE RELEASE
May 14, 2019

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Packaging Hope: Senior Project Sends Medical Care

CEDARVILLE, OHIO -- Backpacks and coolers are staples of college life. But combining the two to save lives in developing nations? Welcome to Rose Thompson's senior capstone project.

For her senior industrial and innovative design capstone project in, Thompson of Xenia, Ohio (Legacy Christian High School), discovered a gap in the way immunizations are delivered to third-world nations. She hopes her new system for transporting vaccines will save lives in underserved parts of the world.

Thompson's project is sponsored by Emerson, a large, global automation company that is committed to innovation, with large corporate operations in Columbus, Ohio. Emerson helped Thompson find a technical solution and provided feedback for her ideas.

According to recent data from the World Health Organization, 5.4 million children under the age of 5 die each year due to vaccine-preventable diseases. Most of those deaths occur in developing countries.

Many of these countries lack a power grid, which contributes to the spoilage of vaccines before they arrive at clinics. Vaccines must maintain a temperature of 2 to 8 degrees Celsius, or roughly 35.6 to 46.4 Fahrenheit. It's estimated that \$100 million is wasted each year due to vaccine loss.

In response to this dilemma, Thompson created a system for storing and transporting vaccines at very low temperatures to maintain their effectiveness before use.

The existing products for transporting vaccines to third-world countries are soft coolers, coolers with ice packs, heavy refrigerators and preservatives. None of these options are effective or lightweight enough to carry to remote locations.

Typically, nurses carry vaccines, as well as syringes, alcohol wipes, gloves and other medical supplies. According to Thompson, most nurses use a standard tote bag that is unstable for the weather and terrain conditions. "The medical personnel who I interviewed said that the current bags are not durable or comfortable for hiking up mountains and crossing streams to the villages."

Thompson created two products to ensure the safe delivery of vaccines. The first is a cooler system that monitors its temperature and notifies the nurse when it is nearing an unsafe temperature. The nurse can then crank a lever on the cooler, which operates a cooling system, so the temperature is regulated without electricity.

The second product is a backpack with secure pockets designed for each medical supply, which also has enough room for the vaccine cooler, so medical personnel only have to carry one backpack.

“I realized that the lack of safe transport for vaccines is a huge problem,” Thompson shared. “With this project I hope that my solution can be a small piece to the big solution. I also hope that this project will raise awareness so others can be a small piece to the big solution.”

Located in southwest Ohio, Cedarville University is an accredited, Christ-centered, Baptist institution with an enrollment of 4,193 undergraduate, graduate and online students in more than 150 areas of study. Founded in 1887, Cedarville is recognized nationally for its authentic Christian community, rigorous academic programs, including its [Bachelor of Arts in Industrial and Innovative Design](#), strong graduation and retention rates, accredited professional and health science offerings and leading student satisfaction ratings. For more information about the University, visit www.cedarville.edu.

Subhead: Rose Thompson, senior industrial and innovative design student, designed a new cooler system and backpack for medical personnel delivering vaccines to third-world countries.